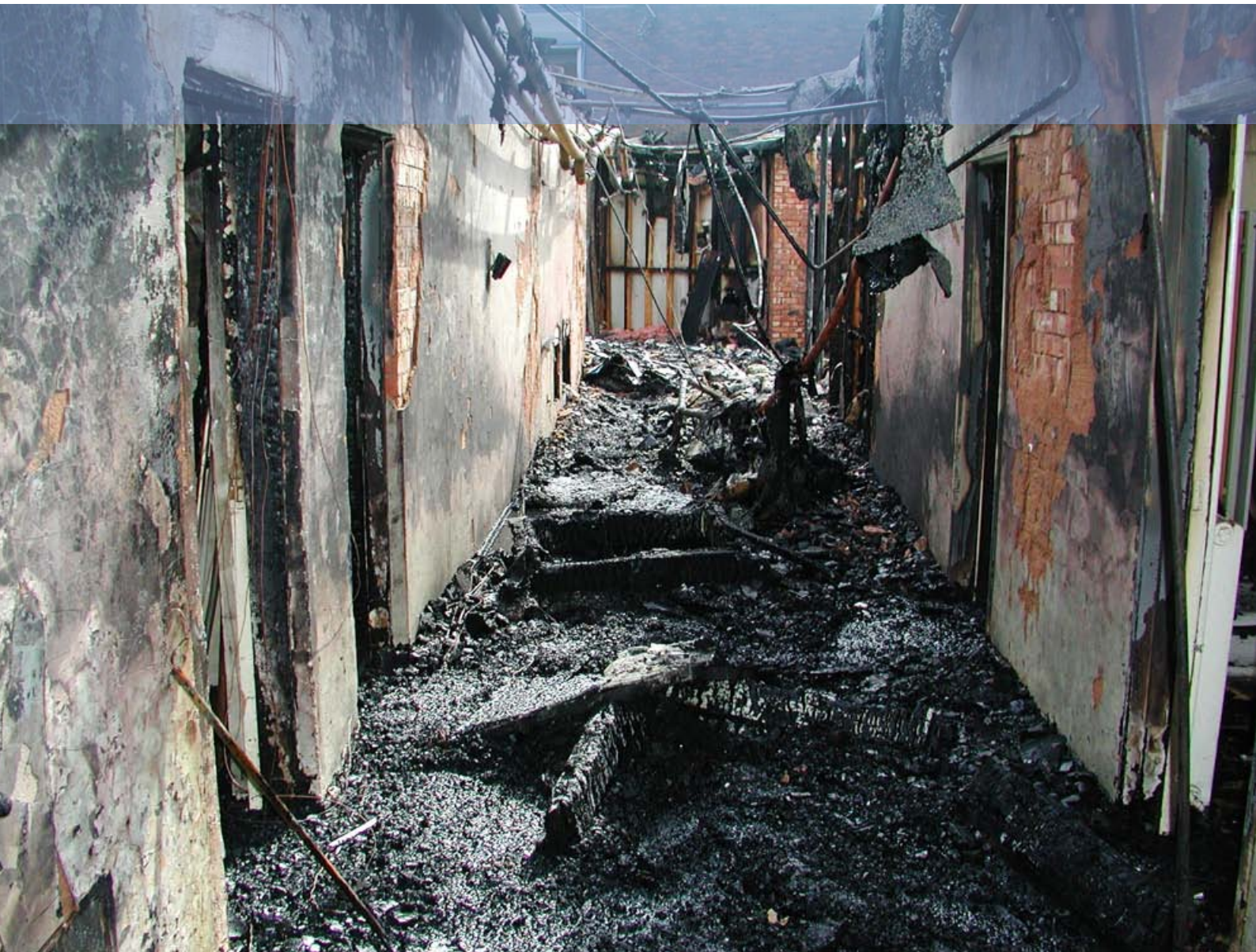
CFOA Publications

Business Case for Sprinklers



Introduction and the Benefits of Sprinklers

The Chief Fire Officers Association (CFOA) is committed to reducing the impact of fire on people, property, the environment and the economy. The wider installation and use of automatic fire suppression systems (sprinklers) is seen as a preventative measure so that people can evacuate the building in the event of a fire occurring. It will also reduce the risk to firefighters who are called to deal with fires.

A great deal of excellent work has been done to reduce fire risk in the home, such as the introduction of hard wired smoke alarms in new builds and the community fire safety work of the fire and rescue services, yet last year (2011/12) 380 people died as a result of fires[1]. Although a welcome decrease from the previous year it remains clear that greater preventative measures need to be taken in order to further reduce the number of preventable fire deaths.

Automatic sprinkler systems have been incorporated into buildings since 1872[2] and were originally seen and developed as a means of reducing fire losses to property and contents. Over recent years there has been a growing recognition of their use as a means of contributing to life safety which is now recognised in current UK guidance to the Building Regulations[3].

Evidence shows that while sprinklers are primarily intended to contain or control fires, they can also be instrumental in saving the lives of people in the room of origin of a fire[4]. There are no cases on record where multiple fire deaths have occurred in buildings with working sprinkler systems, where those systems have been appropriately designed for the intended purpose, have been properly installed and maintained. The evidence also shows that no lives have been lost in the UK due to fire in homes fitted with domestic sprinkler systems.

Firefighters often use 15 times more water from hoses to do the same job as a sprinkler does alone[5].

Moreover, where a sprinkler system has been installed:

- Fire deaths (including firefighter deaths) have been almost eliminated
- Fire injuries reduced by 80%
- Significant improvement in firefighter safety achieved
- Property damage reduced by over 80%
- Effects of arson reduced
- Reduction in the environmental impact of fire
- Reduction to the economic cost of fire

The average time taken for the fire and rescue service to reach an incident and be in a position to intervene is 10 minutes. Most people will have succumbed to the effects of fire within the first five minutes; a sprinkler will activate within the first three minutes and have the fire controlled by the fifth minute.

Smoke damage is a major cause of loss in fires. In serious cases smoke is the main cause of death. Sprinklers wash the larger particles out of smoke reducing its density and toxicity. In addition the water cools the smoke making it less harmful.

1. Fire Statistics Great Britain: April 2011 to March 2012, *http://bit.ly/10Sf71c*
2. History of the National Fire Protection Association, *http://bit.ly/11Hceli*
3. Department for Communities and Local Government, Approved Document B (Fire safety) – Volume 1: Dwelling houses (2006 Edition), *http://bit.ly/12ODoSE*
4. Fire Sprinkler Association (2004), *http://bit.ly/13oCNGd*
5. Automatic Sprinklers, A 10 year study, *http://bit.ly/14shwhi*

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With special thanks to Staffordshire Fire and Rescue Service for their assistance in producing this document.

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Thank you to Greater Manchester, Hertfordshire, Oxfordshire and Staffordshire Fire and Rescue Services for allowing us to use their photographs in this document.

A report[6] published in the USA in 2007 by the National Fire Protection Association (NFPA) concluded that in properties where sprinklers are fitted:

- The death rate per fire is lower by at least 57%
- For most property uses, damage per fire is lower by one third to two thirds
- 89% of reported structure fires have flame damage confined to the room of origin compared to 57% when no automatic extinguishing system is present

A recent study[7] by the US National Institute of Standards and Technology concludes that sprinklers in single family residential units make very good economic sense in terms of the return on investment.

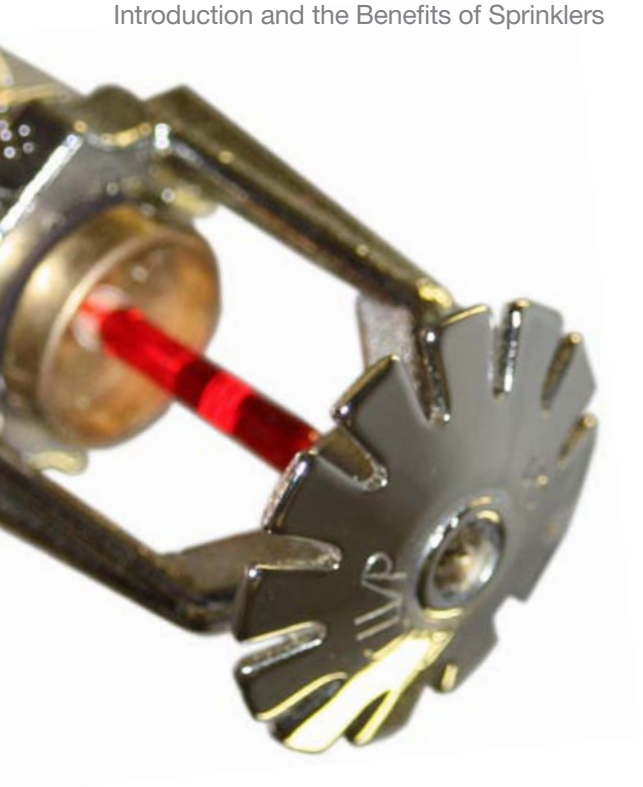
In other parts of the world where the fitting of fire sprinkler systems has become a statutory requirement there have been dramatic reductions in the number of deaths caused by domestic fires. For example in the city of Vancouver where byelaws have been introduced, in 1972-1974 the number of deaths per 100,000 population was just under seven per year. By the period 1992-1998 the number of deaths per 100,000 population had fallen to 0.6, at least partly as a result of the mandatory sprinkler regulations[8].

The most comprehensive study into the effectiveness of residential fire sprinklers to date was carried out by the Rural/Metro Fire Department, Scottsdale, Arizona[9]. In June 1985, the City of Scottsdale, which has a population similar to that of Derby, passed a city ordinance that required all new flatted and commercial structures built after 5 July 1985 be fitted with a fire sprinkler system and all new single family residences built after 1 January 1986 be able to accommodate fire sprinklers.

6. National Fire Protection Association, U.S. experience with sprinklers and other automatic fire extinguishing equipment, June 2007, *http://bit.ly/9aOEEo*
7. U.S. Department of Commerce, National Institute of Standards and Technology (NIST), Benefit-Cost Analysis of Residential Fire Sprinkler System, September 2007, *http://1.usa.gov/18upgnL*
8. Building Research Establishment, Effectiveness of sprinklers in residential premises, February 2004, *http://bit.ly/13iEXc2*
9. Automatic Sprinklers, A 10 year study, *http://bit.ly/14shwhi*

In 1997 the Rural/Metro Fire Department, Scottsdale published *Saving Lives, Saving Money: Automatic Fire Sprinklers:* A 10 Year Study which analysed the impact of the ordinance.

The Scottsdale study included a review of 109 fires that occurred in sprinklered structures, 44 of those being residential structures. In more than 90 percent of these incidents, one or two sprinkler heads controlled the fires, and the average amount of water used to suppress each fire was 209 gallons compared to 3,290 gallons estimated for manual fire suppression in residential properties. It was considered that eight lives were saved over the period as a direct result of the installation of fire sprinkler systems, four of these in residential properties, and that up to $25.4m was saved based on the total potential loss due to fire in sprinklered residential properties.



Given that sprinklers have been around for more than 140 years, a vast amount of knowledge and data has been accumulated on the way they work, their effectiveness and reliability. From this data, it is widely accepted that there is a 91-99% chance of a fire sprinkler system that is correctly designed, installed, maintained and supplied with water, controlling or actually extinguishing a fire.

The individual sprinkler heads in a room with a fire will only activate when the room temperature exceeds the pre-set temperature of the sprinkler head - normally between 57 to 68 degrees centigrade. The heads operate as individual heat sensors - water is only released in the area where there is a fire. Evidence suggests that the chances of a sprinkler malfunctioning are extremely remote - estimates put this at worst 1 in 5 million and at best 1 in 16 million.

The most recent public document on sprinkler reliability, NFPA's *Reasons for Sprinkler Non Operation* (Hall 2010), shows that where a fire in a sprinklered building was large enough to activate, wet sprinkler systems operated to control or extinguish fires in 93% of the cases.

From this data, it is clear that in virtually all cases where a sprinkler system fails to operate as designed, this results from some form of human action or inaction.

An analysis of sprinkler operations undertaken in 2005 in premises in London by the London Fire and Emergency Planning Authority (LFEPA) details information on fires in 163 sprinklered buildings which took place between 1996 and 2005. The sprinklers failed to operate in 12 cases. In a further 10 cases the sprinkler system failed to contain the fire.

In 7% of the cases where the sprinklers did not operate successfully, the following defects or incorrect actions were responsible:

System shut off at time of fire	66%
Manual intervention (at time of fire) defeated system	16%
Lack of maintenance	10%
Inappropriate system for fire	6%
Damaged component	2%

Reasons for Sprinkler Non Operation (Hall 2010)

Total number of fires in sprinklered buildings	163 (100%)
Sprinklers fail to operate	12 (7.4%)
Sprinklers fail to contain fire	10 (6.2%)
Fire extinguished or controlled	141 (88%)

Sprinkler effectiveness (LFEPA Study)

The reasons for failure, where determined, were reported to be:

System off or disconnected	2
Fire took place in unsprinklered area	3
Insufficient heat to operate sprinklers	3
Unspecified fault	1
Water supply failure	1

Reasons for failure (LFEPA Study)

Fire Deaths and the Cost of Fire

Although in recent years there has been a downward trend in the number of fire deaths, this trend has now hit a plateau and new measures are needed to further decrease fire deaths. The latest available figures *(Fire Statistics Great Britain, 2011-12)* show that in Britain the fire and rescue service (FRS) attended a total of 272,000 fires which resulted in 380 fire-related deaths, the majority of which (287) occurred in dwelling fires[10]. In addition to this devastating loss suffered by members of the public who are impacted by fire, there have been 17 firefighter fatalities in the past decade. Many of these would have been prevented if there were sprinkler systems present at the time these incidents occurred.

Sprinkler systems increase firefighter safety. Furthermore, the Fire Statistics report shows:

- Fire fatality rates are higher for people aged 80+ and for males
- There were 11,298 non-fatal casualties in fires in Britain in 2011-12
- The main cause of accidental dwelling fires remained the misuse of equipment/appliances (14,700 fires)
- Of the 287 deaths in dwellings in 2011-12, 245 (86%) were of accidental causes
- In 2011-12 there were 24,100 fires recorded in buildings other than dwellings
- A total of 272,000 fires were attending in 2010-11, of which 43,500 (16%) were in dwellings. Findings from the 2004-05 Survey of English Housing on all outbreaks of fire experienced by households in England, suggested that the fire and rescue service attend approximately one fifth of all domestic fires. This is because many of the fires recorded in the survey are minor and are able to be put out by someone in the home, and therefore the FRS were not called. See ODPM Statistical Bulletin – *'Fires in the home: Findings from the 2004-05 Survey of English Housing'*
- The number of deliberate primary fires - 12,791
- Deliberate fires in dwellings - 5,819
- The most common identified cause of death from a fire incident is being overcome by gas or smoke
- Similarly dwelling fires had more non-fatal casualties per 1,000 fires than any other location. In 2010-11 there were 199 non-fatal casualties per 1,000 dwelling fires compared with 49 per 1,000 for other building fires
- Around 80% of casualties occur in fires in the home
- Survey research shows that the proportion of households with a smoke alarm increased rapidly from 8% in 1988 to 70% in 1994, but has risen more slowly in later years, reaching 86% in 2008

10. Fire Statistics Great Britain: April 2011 to March 2012, *http://bit.ly/10Sf71c*

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In 2011-12, fire and rescue services attended a total of

272,000 fires

which resulted in

380 fire-related deaths

Fire represents a significant cost to the economy in terms of its impact on individuals, property, FRS and the environment. The cost of fire can be broadly broken down into three areas: cost in anticipation, cost as a consequence, and cost in response.

- **Cost in anticipation** - structural and passive fire protection in buildings and fire prevention measures undertaken to prevent or mitigate damage caused by fire. FRS have also become active in this area, undertaking fire safety work in the form of inspections and community fire safety.
- **Costs as a consequence**, incurred as a result of fire. These costs are due to exposure of property, individuals or the environment to fire and its products.
- **Cost in response** - extinguishing and clearing up after fire (society bears the majority of these).

In 2008, the total economic cost of fire in England was estimated at £8.3bn, equivalent to approximately 0.91% of the gross value added of the economy[11]. Of the £8.3bn, £3.3bn can be attributed to the consequential costs of fire such as property damage, lost business, and the loss to the economy from injuries and deaths. It has been suggested that an average of 150,000 new residential premises are built each year, to fit each of them with a fire suppression system would cost around £300million, representing a small fraction of the overall cost of fire on the economy.

11. Department of Communities & Local Government, The Economic Cost of Fire: Estimates for 2008, February 2011, *http://bit.ly/12OE2zs*

The human cost of fire is often said to be the most difficult to estimate and includes healthcare costs, lost output and emotional and physical suffering. The Department for Communities and Local Government's 2008 figures estimate the cost of each fire fatality as £1.65m and £185,000 for a serious injury[12]. There is a widespread belief that these costs understate the true costs. For example, Gus McGrouther Professor of Plastic and Reconstructive Surgery Research, at the University of Manchester has stated that many of those burnt in fires require upwards of eight separate surgical procedures over many years.

Fire also has a considerable impact on the environment, which can be divided into impacts on water, land and air. Fires in the UK are estimated to release over two million tons of carbon dioxide into the atmosphere every year - this is excluding further emissions resulting from constructing replacement buildings and in recycling the fire damaged materials. Research carried out by Bureau Veritas suggests that sprinklered fires release between 7.8% and 21.6% less carbon compared with an un-sprinklered fire in a similar building[13].

FRS will use 15 times more water to control a fire where no sprinkler is in place to control it. The Bureau Veritas report also shows the annual water use for fire fighting in England and Wales, in tackling un-sprinklered commercial and industrial fires, to be between 25,945,920 and 18,865,392,000 litres of water. If all of these fires occurred in sprinklered buildings, the report estimates the quantity of water used would fall to just 4,368,000 litres per year. Further statistics show that widespread use of sprinklers could save up to 96% of the 5.6 billion litres of water used annually in the UK to fight large fires - three months supply of water for the entire population of a city the size of Leeds.

Where a sprinkler or fire suppression system is installed there is less damage to the environment both in terms of the products of combustion liberated and the volume of contaminated water generated. Overall, there is huge potential for sprinklers to contribute to achieving sustainability:

Sustainable Issue	The potential contribution of fire sprinklers to achieving sustainability
Economic	• Reduced business disruption and reduced business costs (loss of stock and equipment, clear up, waste disposal costs, rebuild) • Reduced job losses • Reduced adverse impact on business reputation, on clients and on the supply chain • Reduced insurance costs and property costs • Reduced fire fighting and fire investigation costs
Social and Community	• Reduced risk of death and injuries • Improved physical and mental health • Reduced adverse community impact (associated with local disruption, evacuations, cordons, road closures) • Improved business reputation, particularly with the local community • Reduced adverse impact on local employment opportunities and associated community cohesion and stability
Environment	• Reduced negative impact to water, land and air environments • Reduced requirements for hazardous waste disposal • Reduced carbon emissions, reduced contribution to UK carbon footprint • Reduced water wastage

The threat from fire is often overlooked as deaths and injuries occur sporadically and therefore do not have the same impact as a collective tragedy. This also affects people's views on the economic consequences of fire which are not viewed collectively.

12. Department of Communities & Local Government, The Economic Cost of Fire: Estimates for 2008, February 2011, *http://bit.ly/12OE2zs*
13. Bureau Veritas, Assessing the role for fire sprinklers, April 2011, *http://bit.ly/13QeUez*

The Cost of Sprinklers

There remains a huge misconception surrounding the costs of sprinklers. Many people take a very short term view, believing the total cost of a building to be the costs accrued up to the day of its opening - the cost benefit of anything that goes into the building is judged accordingly. This clearly cannot be the case. The true costs of a building are the long term costs over the life span of the use for that building. For instance, if you aim to deliver a school as cheaply as possible, you may leave out fire safety measures. However, one, two or even ten year later that building could catch fire and be lost completely, resulting in the addition of many more costs to the building: economic; environmental; and societal.

The LGA seeks to take a longer term view in encouraging growth, protecting our environment and making our economy work as hard as it can. The table below shows a rule of thumb for the costs of installation of sprinklers[14].

Primary School - 125/150 pupils	Approx. £65,000 for sprinklers + £40,000 for additional project costs	Approx. £10-15/m^2
Typical 3/4 bedroom detached house	£3000-£3500 if mains pressure adequate (add £750 if not) - reduced by 10-15% for more houses on a development	1-2% of build costs
High rise or larger public building with complex layout	1.5-1.9% of new build costs	£18-25/m^2 of the building

If considered early in the planning stages, sprinklers can be included at little cost to delivering the building project. There are design freedoms and flexibilities that, when considered early enough, will lead to not only a safer and more sustainable building, but also one that meets the economic challenges that we face today. The protection of our heritage, environment and culture is not something that we can afford to take a short term view on and sprinklers should be considered a key component in the long-term strategy.

14. Local Government Association, The cost of sprinklers, *http://bit.ly/12iLrfA*

The main cost associated with domestic fire sprinkler systems is the capital cost of installation. There are also on-going maintenance costs. The cost of installation is estimated to be about 1- 2% of the total cost of construction. Annual maintenance costs are between £75-£150 per year.

A further cost, which can vary significantly depending on the interpretation of individual water companies, is the cost of water supply. Sprinklers are currently not classed as a domestic use of water under the Water Industry Act 1991. Water companies are very heavily regulated and are under constant pressure to drive down costs while at the same time raising standards, within this operational framework there are many drivers which conflict with the potential ideals for sprinkler installation. Recent developments in the wider use of sprinklers in domestic dwellings and residential premises have further highlighted that the issues are not adequately covered by current water industry legislation. The most effective way of addressing this is to change the regulations and achieve a balanced application thereby creating a framework which allows stakeholders to operate as harmoniously as possible.

Section 5 of the BRE 2012 report, *Cost Benefit Analysis of residential sprinklers*[15] prepared for CFOA, presents a cost benefit analysis of the expected impact of the residential sprinklers to determine whether or not there was a positive gain in providing them in a range of building types, including houses, care premises and blocks of flats.

In doing so, BRE used a statistical value for each life saved of £1,692,000 and £50,450 for each prevented injury. These figures were the result of the Department of Transport figure, used in the Treasury Green Book [HM Treasury 2003] and Economic Cost of Fire 2004 [ODPM 2006] multiplied by the increase in GDP from 2004 to 2010, a factor of 1.23.

As the risks associated with building safety are very different from those of road safety, the applicability of these figures as the basis of assessment in fire sprinkler considerations is open to debate. Consequently a number of other cost benefit studies founded on a 'willingness to pay' basis have used a range of different values.

Nonetheless the quoted BRE statistical values offer a reasonable indication of the financial implications involved in such assessments, against which retrofit implementation costs might be compared.

Unlike the previous BRE study, the input data for the cost benefit analysis made use of comparable overseas data where specific UK does not exist. As such, the updated BRE report considered the following factors:

- Value of each death prevented
- Value of each injury prevented
- Value of property damage in a fire
- Interest rate for discounting future values
- Capital recovery factor
- Sprinkler system reliability
- Sprinkler system lifetime
- Sprinkler system activation
- Sprinkler system effectiveness
- Installation costs
- Water supply costs
- Maintenance costs
- Fires, deaths, injuries and property damage
- Numbers of buildings
- Number of residents per building
- Risks of fire, death, injury and average damage

It is also worth considering the factors not considered by BRE as part of the cost benefit analysis of sprinkler installation, these include:

- Accidental water damage
- Environmental impact discharge
- Insurance premium reductions
- Fire and rescue service cost savings
- Design/construction trade offs

15. Building Research Establishment, Cost Benefit Analysis of Residential Sprinklers, *http://bit.ly/11yDGAC*

These additional factors do not appear to have been taken into account by BRE either because data was unavailable or too hard to quantify with accuracy at the time. Importantly, in assessing the factors that were taken into account, the study concluded that sprinklers probably would be cost effective in most blocks of purpose built flats and larger blocks of converted flats, therefore going further than the current requirements of the building regulations.

Sprinkler systems not only provide benefits in terms of life safety and protection of property, they also reduce the impact a fire has on the environment by limiting the production of carbon dioxide and other products of combustion.

Implicit in the environmental benefit of quick and reliable suppression of fires, is the prevention of the need to replace and repair buildings, producing significant savings in respect of the energy and resources that have to be expended in buildings.

To summarise, these benefits could include any or all of the following:

- Extent of post fire demolition or refurbishment and repair to buildings
- Extent of fire-resisting glazing
- Exposure to harmful materials and substances that can be released in large fires
- Risks of polluting ground, air and water courses
- Costs and impact of treating water used by the FRS
- Removing the need to relocate residents to temporary or permanent accommodation by preventing major destructive fires, and
- Facilitating the continued use of existing buildings
- Protection of heritage and heritage contents and fabric

While the principle benefit to the FRS must be the significant reductions in the exposure of the firefighters to danger, there will also be cost savings:

- Lower number of false alarms cause by spurious operation of fire detection systems
- A reduced number of FRS appliances and personnel required by an incident
- A reduction in the duration of the attendance time
- Experience shows that many fires are extinguished by the time the FRS attends

An important recognition is that in certain circumstances the presence of a sprinkler system may permit significant cost savings in respect of the provision of other fire protection measures.

It is well known that insurers have such confidence in sprinkler systems that there are invariably substantial premium discounts available for premises so protected. The Fire Protection Association (FPA), which represents the views of fire insurers says; “Insurers will be certain to take a more favourable view of firms whose premises have approved sprinkler systems”. It is also likely that the self-insurance element of a fire insurance policy (the policy excess) will be much lower for sprinklered buildings.

Update to the Building Research Establishment (BRE) Report - Effectiveness of sprinklers in residential premises

CFOA commissioned BRE to conduct an updated study of the effectiveness of sprinklers in residential premises. The report was published in August 2012 and serves as an update to the previous BRE report commissioned by The Office of the Deputy Prime Minister in 2006. The initial BRE report was derived mainly from evidence taken from the UK and ignored a wealth of data available from other countries such as America and Canada. As such its recommendation on the cost effectiveness of sprinklers was confined to residential care homes and tall blocks of flats (over 18m in height).

Recognising a greater evidence base, the cost benefit analysis of the BRE report 2012 concludes that residential sprinklers as additional safety measures are cost effective for:

- All residential care homes for elderly people, children and disabled people (including those with single bedrooms)
- Most blocks of purpose built flats and larger blocks of converted flats where costs are shared
- Traditional bedsit type HMOs where there are at least six bedsit units per building and the costs are shared

The findings of the report are to be welcomed as they further demonstrate that sprinklers are reliable, effective and cost beneficial. Furthermore, the BRE 2012 report includes a section not accounted for in the earlier edition, Section 7 on Variations: Future Trends, Special Cases, Trade-offs and 'What-if' scenarios. This takes into account some of the uncertainties associated with making the cost benefit analysis, such as future social and economic changes, and changes to building regulatory and technical standards, which could in future affect the outcome of the current analysis. For example, an ageing population could lead to increases in the number of elderly, infirm and mobility impaired people, living in their own homes longer rather than relocating to care homes.

There are also increasing numbers of people living alone rather than in a family setting. The increase in house prices has resulted in an increasing trend for open plan layouts in flats and houses. Such layouts provide less compartmentation and therefore allow for uninterrupted spread of smoke and fire. All of these factors are likely to increase the risk of fires and fire deaths amongst certain sections of society and in certain buildings; as such it will alter the cost benefit analysis.

Sprinklers in Domestic Properties

Fires in domestic buildings remain one of the largest contributors to the total economic cost of fire, accounting for over 23% of the total, with the average cost of a fire in a domestic property estimated at £44,523[16].

The current regulations are informed by the findings of the 2006 Building Research Establishment Report - *Effectiveness of sprinklers in residential premises,* commissioned by the Office of the Deputy Prime Minister. The report concluded that residential sprinklers are probably cost effective for residential care homes and tall blocks of flats; however, it found that there was no evidence to suggest that sprinklers are cost effective for other dwellings. As outlined below, CFOA have since commissioned BRE to undertake an update of this report, the findings of which recommend sprinklers are cost effective in a wider array of dwellings.

Fatal casualties in dwelling fires rates per million population by age group, England, 2000-08(1)

Age group	2000	2001	2002 (2)	2003 (2)	2004	2005	2006	2007	2008(1)
Rate (per million) of fatal casualties	7.0	7.3	6.2	6.9	5.3	5.7	5.7	4.9	5.0
Under 1 year	1.7	1.8	1.8	3.5	-	3.3	1.6	4.7	-
Under 1 year	1.7	1.8	1.8	3.5	-	3.3	1.6	4.7	-
1-4	4.1	5.5	4.8	10.6	7.5	4.4	5.1	3.3	1.6
5-10	3.1	3.7	4.8	1.6	3.0	2.8	2.3	0.6	1.7
11-16	1.8	1.0	1.0	0.8	1.0	0.8	1.3	0.5	0.3
17-24	2.5	4.4	2.7	3.2	2.0	2.9	1.1	1.8	1.6
25-29	3.7	4.3	4.4	7.4	3.2	3.2	2.4	2.7	2.3
30-59	6.1	5.6	5.3	6.2	4.5	5.0	4.4	4.3	4.5
60-64	7.5	5.9	8.3	6.2	6.4	8.5	7.4	5.2	6.6
65-79	13.2	12.2	10.6	10.4	9.7	11.0	12.1	9.6	8.9
80 and over	35.8	38.1	24.9	28.1	21.3	18.7	26.4	23.3	23.8
Unspecified	-	-	-	-	-	-	-	-	-

16. Department of Communities & Local Government, The Economic Cost of Fire: Estimates for 2008, February 2011, *http://bit.ly/12OE2zs*

(1) Data for fatal casualties 2008 is provisional and subject to change.

(2) Excluding incidents not recorded during periods of industrial action in 2002 (total of 18 incidents) and 2003 (total of five incidents). Sources: Fire incidents data base, Communities and Local Government, and Mid-Year Population Estimates 2000 to 2008, Office for National Statistics.

Evidence shows that certain population groups are more at risk from domestic fires. Research carried out by the Department of Communities and Local Government (DCLG) has identified the groups who more at risk of fire than the general population[17]. According to this research, the vulnerable groups tend towards lower income/deprived demographic groups, specifically:

- Single, middle-aged people, who drink and smoke at home (aged 40-59 with a male bias)
- Female single parents
- The very elderly (with a slight female bias)
- People with disabilities and especially those who are mobility impaired
- Young people (16-24) - including students who are living communally, i.e. sharing living rooms, bathrooms and kitchens

The fatal casualties in dwelling fires (rates per million population), broken down by age group, clearly show that people aged 65 and above are more susceptible to death in dwelling fires. For those aged 80 and above the risk is considerably higher still[18].

Although in recent years there has been a downward trend in the number of domestic fire deaths, this trend has now hit a plateau and new measures are needed to further decrease domestic fire deaths. The government's position that the status quo cannot be allowed to prevail is laudable and continued investment in the Fire Kills campaign should also be applauded. However, the government has yet to implement any significant initiatives to further reduce the number of deaths in accidental dwelling fires.

As highlighted in responses to a series of Written Questions tabled by Lord Harrison (see Appendix A), continued investment in the Fire Kills campaign and support for fire safer cigarettes are the government's principle strategy for further reducing domestic fire deaths. However, cigarettes are not the sole or indeed major cause of domestic fires. Just 6.2% of all fires in domestic dwellings in 2010-11 were caused by smokers' materials. It is therefore unlikely that the introduction of fire safer cigarettes alone will have significant impact, whereas a sprinkler system will save lives regardless of how the fire started. NHS figures show that around 114,000 people die of smoking related deaths every year[19]. Research carried out by the Department of Public Health at Oxford University reported that smoking costs the NHS over £5 billion per year[20]. The introduction of fire-safer cigarettes will have little impact on this.

17. Department of Communities & Local Government, Research Bulletin No 9 - Learning Lessons from Real Fires: Findings from Fatal Fire Investigation Reports, July 2006, *http://bit.ly/112Aell*
18. Table from House of Commons Written Answers – Fire Deaths, Hansard 2 Dec 2009: Column 782W, *http://bit.ly/1az6uby*
19. National Health Service website, *http://bit.ly/V8mQBo*
20. University of Oxford website, *http://bit.ly/cbRXUg*

An increasing proportion of fire deaths in dwelling occur in the room of origin[21] and although smoke alarms are an excellent warning system they are less likely to prevent a death in such circumstances. Conversely, a sprinkler system will activate at an early stage of a fire and, at the very least contain the fire, restricting its spread to other parts of the building including the escape routes. In many cases, the system will actually extinguish the fire. Therefore, making the home safer at source appears to be the most appropriate method of improving home fire protection significantly reducing fire risk for some of the most vulnerable in society, sprinklers providing the obvious solution.

It is recognised that the elderly in society are at a higher risk from fire than others. Consequently, as the population ages, levels of vulnerability will also increase and the current approaches to reducing risk of death and injury will become less effective. In addition, care in the community will have to grow, simply because the nation will not be able to afford to accommodate increasing numbers of elderly and infirm people in residential care or nursing homes, where the need for sprinklers has been recommended. Therefore, individual private dwellings will need to have enhanced levels of protection if we are going to prevent significant increases in the numbers of fire related casualties occurring in the future.

The government has taken action to make homes more sustainable; recognising that the nation's ageing demographic means that the status quo is inadequate for future requirements. Current evacuation procedures for home safety are becoming less appropriate as people live longer, remain in their home longer and may then have insufficient mobility to evacuate as easily. However, the government have made no assessment of the likely impact on fire risk of an ageing population or of an increase in vulnerable adults with either mental health or physical disabilities living independently in domestic settings.

21. Fire Statistics Great Britain: April 2011 to March 2012, *http://bit.ly/10Sf71c*

Sprinklers in High Rise Flats

High rise social housing blocks create a number of specific and unique fire safety and firefighting challenges that may not exist in other properties. The majority of such blocks were built between 1950 and 1970 when design and fire protection standards were lower than those required by current building regulations (i.e. all those over 30m in height should be fitted with sprinklers at construction).

In recent years there have been a number of serious fires in older high rise blocks that have resulted in occupant and firefighter fatalities. Following a major fire resulting in six deaths in 2009 in the social housing block Lakanal House, questions were asked about the potential benefits of automatic fire sprinklers in protecting residents in such properties. In response, a DCLG report suggested that retrofitting sprinklers to such buildings would not be cost effective or practical.

Where evacuation is required, the process takes longer from upper floors and sprinklers provide significant benefits in addressing this risk. Furthermore, where a fire occurs in a high-rise block, it can take a significant time before the fire and rescue service can commence firefighting operations, with the potential of greater risk to firefighters. Sprinklers can assist in controlling the fire growth whilst reducing this time between the outbreak of fire and the start of the fire suppression activity, reducing the risk to firefighters.

There are over 4,000 high rise blocks owned or managed by local authorities across the UK. Information provided by DCLG[22] list 213,199 individual dwellings in 3,778 high rise premises in England. There are 797 such blocks in Scotland and 15 in Northern Ireland but unfortunately comparable figures for Wales were not available at the time of writing.

These tower blocks would have been designed and constructed in accordance with the building regulations of the day and therefore were not fitted with sprinklers.

The 2012 BRE report suggested that the frequency of fire per accommodation unit increased with building height, but that the risk of death per fire was not significantly affected by height. UK fire statistics suggested that in multi-storey buildings, the number of fires per floor were not evenly distributed and that there were more fires at ground floor level. However, recent fires appear to call this conclusion into doubt or at least suggest that while the numbers proposed by the statistics may be correct, the more severe incidents which require significant fire and rescue service intervention, and hence result in media coverage, are generally on upper floors.

Fire Safety in purpose-built blocks of flats[23] published by the Local Government Group discusses the relative risks in flats and states that around 10% of the population live in purpose built flats. In 2009-2010 some 25% of recorded dwelling fires occurred in such properties and 23% of fire deaths were in this category of dwelling. Such statistics are clearly indicative of the real fire safety and life risks that are involved in un-sprinklered premises.

22. Department for Communities & Local Government, Housing Stock Summary, December 2012, *http://bit.ly/133aUq2*
23. Local Government Group, Fire Safety in purpose built blocks of flats, July 2011, *http://bit.ly/13iK7Vq*

Hertfordshire Fire and Rescue Service

The Service has undertaken a series of exercises designed to test and practice their procedures for dealing with fires in high rise building blocks. As a result, they have determined that it takes 20 minutes from arrival at the incident to establish a bridgehead with the resources required to safely deal with a fire on the upper floors. Compared to a fire in a low risk block, this time delay before firefighting can commence, clearly encourages significant fire growth, increases the risks involved for firefighters and residents, and leads to greater damage being caused, with consequential increased remedial and re-housing costs.

Sheffield Retrofit Project - Callow Mount[24]

A pilot project to retrofit a high-risk council block with automatic fire suppression systems found:

- The retrofit was completed with little or no disruption to the residents who remained in their homes throughout the installation programme
- The owners of the building and residents expressed a high degree of satisfaction with the workmanship and finished product and in not having to leave their homes or pack up their possessions
- In recording true and accurate costs of this project (and other similar exercises) authoritative data is provided for housing authorities, associations and landlords, which will allow them to consider the cost benefit/effectiveness of installing automatic sprinkler systems
- The approach adopted provides a template for organisations considering the use of sprinklers when developing their fire safety strategy for such buildings as part of a redevelopment or refurbishment programme, or as a result of actions that may be required following a fire risk assessment
- The sprinkler installation was carried out at a cost of £1,150 per flat. The cost of annual maintenance will be £250 per year if a contract for the whole block is entered into and if access can be guaranteed at the same time, where this is required at 2011 prices. The combined cost of installation and maintenance provides an annualised cost per flat of £40 over a 30 year time frame

BAFSA is confident that the Callow Mount Project has proven that:

- It is possible to retrofit sprinklers into occupied social housing without decanting tenants, or serious disruption to their lives
- The cost of sprinklers per block or per flat will compare very favourably with other fire protection methods which might otherwise be required to provide acceptable levels of fire safety for older blocks, especially for blocks such as Lakanal House, which only have a single staircase
- Sprinklers are fully accepted by the tenants and occupants
- British Standard 9251 can be used for such installations
- The work can be undertaken in short order
- Evidence of the potential to reduce the cost of having to re-house tenants and undertake major refurbishments etc. following a fire has also been proven

24 British Automatic Fire Sprinkler Association, Callow Mount Sprinkler Retrofit Project, *http://bit.ly/13YMlGn*

Sprinklers in Care Homes

"Despite a recommendation that care homes be fitted with sprinklers and the close regulation of their construction, recent changes in the way fire safety is managed has created confusion in the care home sector. The inspection regime imposed by the Fire Precautions Act 1971 and Registered Homes Act 1984 (under which virtually all care homes were required to submit to regular inspections by their local fire authority) has been removed. Instead, the owners and managers of homes now have to comply with the more complex impositions of the Regulatory Reform (Fire Safety) Order 2005 which came into force in October 2006."- Local Government Association (LGA)[25]

The Fire Safety Order has wide-ranging implications for care home owners and managers, many of whom still seem unaware of the legislation or their new obligations. The LGA provides solutions to this and suggests that the care home sector, like many other occupancies, may find that the inclusion of sprinklers (especially in new or refurbished premises) will provide increased cost-effective protection and greater measures of confidence in the levels of safety in care homes.

Installation of sprinklers in new build premises is very simple and highly cost effective. The sprinkler pipework is routed through the building at the same time as the other building services and all the pipework can be concealed. Sprinkler heads can also be concealed if desired or required.

25. Local Government Association, Sprinklers in care homes, *http://bit.ly/10A2y9s*

Sprinklers in Schools

On average, each year in the UK there are over 1,500 fires in schools and other educational establishments, (an average of 4 every day of the year). The most recent figures from Zurich Municipal, from 2008, show the cost of fires in schools to be £67 million per year[26], however the direct cost of school fires is increasing and is currently estimated to be in the region of £100 million per year. However, when uninsured and social costs are taken into account, e.g. loss of coursework, teaching aids, and community facilities etc. the true cost is far higher.

The current government guidelines, BB100 introduced in March 2007 say that all new schools should have sprinklers fitted. In introducing this guideline the then Minister of State for Schools and Learners, Jim Knight MP, announced "it is now our expectation that all new schools will have sprinklers fitted." Any exception to this must be justified by demonstrating a school is low risk and that the use of sprinklers would not be good value for money.

School fires continue to occur; the latest reports suggest that fires are getting bigger and more costly. The impact of these fires is significant, not just in financial terms, but also in terms of the devastating effects on the communities they serve, the environment and the disruption to students, teachers and families. The effect on children's education is not just confined to lost coursework, but often includes longer travelling times, disrupted social groups and poorer facilities.

The argument for installing sprinklers in schools is compelling and there are also substantial cost savings for local authorities. Schools without sprinklers are finding that insuring their premises is increasingly difficult; however, some insurance companies significantly reduce fire insurance premiums for schools with officially sanctioned sprinklers. Zurich offer discounts of up to 70%[27].

The savings don't end there:

- Sprinkler systems reduce fire and rescue service involvement
- Avoid contaminated water run-off
- Use around 5% of the water of one fire and rescue service hose
- Allow affected schools to return on the same day
- Help reduce building design costs

The devastating effects of fire spread much further than the local authority's budget. It disrupts the lives of pupils and school staff, forcing them to retreat to temporary accommodation for a long time, perhaps even years, whilst the local authority must divert resources to deal with the aftermath. Communities also suffer, lacking accommodation for night classes, local events and other help groups. The problem is compounded for school pupils undergoing examinations, whilst school work, coursework, submissions and a lifetime of teaching notes and aids are lost forever. Naturally, such loss can prove immensely stressful for pupils, teachers and parents.

26. Zurich Municipal, Cost of school fires creeps up, *http://bit.ly/11aGodJ*
27. As above, *http://bit.ly/11aGodJ*

In many cases, safety constraints conflict with architects visions for new schools. Facing so many safety considerations, designers frequently compromise their ideals for a secure alternative. However, when included early in the school plans, sprinkler systems provide a wealth of design freedoms and cost savings, while allowing schools to meet and exceed their safety requirements.

For example, sprinkler systems offer architects the opportunity to:

- Adapt compartmentation requirements which can result in decreased travel distance
- Decrease fire resistance periods to structure elements
- Change the standards, number, location and positions of fire resisting screens and door sets
- Adapt layouts to meet the schools exact needs
- Improve escape provision, e.g. introducing phased evacuations
- Enhanced provision for people with disabilities
- Consider different surface finishes for displays etc.
- Propose different sizes for stairs
- Choose internal and external fire and rescue service access
- Provide community use or partial occupancy

Some, but not all, UK education authorities are introducing policies to install sprinkler systems in new school buildings and some have also decided to protect existing buildings when these are subject to a major refurbishment.

In 2007, acknowledging growing concerns with schools fires, the Department for Education and Skills commissioned and published a report[28] into the costs of sprinklers in schools. The data showed that the additional capital costs of installing sprinklers in new build schools ranges from just 1.4% to 4.48% of construction costs.

28. Department for Education, A cost analysis of sprinklers in schools, Revised January 2007, *http://bit.ly/133bsfx*

Sprinklers in Commercial and Industrial Premises

"Historically, the UK's largest fire losses, based on information from the Association of British Insurers (ABI) and the Fire Protection Association (FPA) have been in warehouses. According to these figures, fire losses in warehouses make up around 10% of the total cost of all fires with average losses exceeding £1,000,000.

While there may be fewer fires in warehouses than manufacturing, the impact on business in financial terms can be disproportionately higher through loss of property, stock and the costs of business interruption and the liability implications which arise.

In the UK, the existence of Local Acts currently makes provision for some local authorities to require buildings over 7,000m^3 to install fire prevention measures - including sprinkler systems - in buildings which otherwise could be exposed to unnecessary fire risk.

However, by comparison, in the majority of the largest EU countries, fire sprinklers must be installed in commercial and industrial properties with an average floor space one tenth of that regulated in the UK (20,000m^2). For example, the following European countries with much smaller regulation on maximum sizes of warehouses without sprinklers include: Austria: 1,800m^2; Germany: 1,800m^2; the Netherlands: 1,000m^2; Norway: 800m^2; and Spain 2,000m^2.

Consequently, business losses on the continent are far lower than the UK's £865 million in 2008. For example, in Germany in 2008, damage as a result of fire cost £400 million i.e. half that of the UK, and the European Insurance and Reinsurance Federation (the CEA) has reported that commercial fires statistically decreased by 6 per cent in Germany in 2008" – LGA[29]

29. Local Government Association, Sprinklers in commercial and industrial premises, *http://bit.ly/112Esjg*

Sprinkler Stop – Plastic Factory, Gloucestershire, 25 April 2011

Tally Giampa, Head of Fire Safety Enforcement & Risk at Gloucestershire Fire and Rescue Service reported that at 05:21 on 25 April 2011, a call was received from an automatic fire alarm at Berwin Polymers, Church Road, Lydney.

On arrival, crews from Lydney Fire Station discovered that the low-pressure alarm was activating on the sprinkler system. Upon gaining entry, the crews were faced with an area of 90 metres by 45 metres, completely smoke-logged. Thermal imaging equipment was then used to locate the source of the fire. It was evident that as the fire developed, near the top of the racking system in the warehouse, a single sprinkler head activated and suppressed the fire, to the extent that minimal fire and rescue service intervention was required. Four firefighters, wearing breathing apparatus and using a hose-reel damped down the remains of the fire. Damage was restricted to the immediate area of the fire, mainly involving wooden pallets. The incident occurred in the early hours of a Bank Holiday when the factory was unoccupied and would have resulted in a serious fire if it had not been for the intervention of the sprinkler system.

J Sainsbury's Distribution Centre, Stoke on Trent, 31 March 2011

Staffordshire Fire and Rescue Service have reported that on the 31 March 2011, a fire occurred at Sainsbury's main distribution centre, close to the main A50 in Stoke on Trent.

Phil Smyth, Staffordshire Fire & Rescue Service Sprinkler Advocate said that the fire in the 50,000m^2 logistics centre occurred through a fault on a fork lift truck. As the fire developed, near to a loading bay, a single sprinkler head activated and controlled the fire, so much so that minimal fire intervention was required and the large logistics centre suffered little disruption. The sprinkler system was installed as a building regulations requirement due to excessive travel distances in this huge building, but has now proved its worth in the field of property protection and business continuity, as well as safety to life.

Appendix A – Written Answers

Fire Safety (23.1.12)

Questions asked by Lord Harrison
To ask Her Majesty's Government, further to the Written Answer by Baroness Hanham on 1 December 2011 (WA 93), which relevant research projects are currently being considered by the Department for Communities and Local Government. [HL14820]

The Parliamentary Under-Secretary of State, Department for Communities and Local Government (Baroness Hanham):
My department is considering research on the incidence and impact of fire in the future, in particular in relation to an increasingly ageing population, and the relationship between mental health and deliberate and accidental fires.

Lord Harrison: To ask Her Majesty's Government, further to the Written Answer by Baroness Hanham on 29 November 2011 (WA 49), what research was carried out by the Department for Communities and Local Government to calculate the life-saving impact of cigarettes that comply with the new safety standards; and whether they will place a copy of the research findings in the Library of the House. [HL14821]

Baroness Hanham: In 2004, the Office of the Deputy Prime Minister commissioned research on the comparison of the propensity of fire safer cigarettes and conventional cigarettes to ignite textile materials used in a domestic environment. The report produced was published in 2006, and is available on the DCLG website at: *http://bit.ly/12il8VB*. A copy has also been placed in the Library of the House.

Fire Safety (24.1.12)

Questions asked by Lord Harrison
To ask Her Majesty's Government what was the primary cause of each fire in a domestic dwelling in England for each of the past five years.[HL14822]

The Parliamentary Under-Secretary of State, Department for Communities and Local Government (Baroness Hanham):
The numbers of fires in dwellings by source of ignition for the past five years are shown in the table opposite.

Lord Harrison: To ask Her Majesty's Government what assessment was made in the preparation of the 2010 Cost Benefit Analysis of Options to Reduce the Risk of Fire and Rescue in Areas of New Build Homes of the merits of requiring installation of automatic fire suppression systems in new residential premises with respect to (1) comparative evidence from other countries, (2) the effect on the environment of a reduction in the size of fires, (3) the effect on the economy of a reduction in the size of fires, (4) the effect on firefighter safety, and (5) the risk of fire for an ageing population.[HL14878]

To ask Her Majesty's Government what assessment has been made of the (1) economic, and (2) environmental, impact of a reduction in the size of fires due to a wider use of automatic fire suppression systems in domestic properties.[HL14879]

Baroness Hanham: The Cost Benefit Analysis of Options to Reduce the Risk of Fire and Rescue in Areas of New Build Homes report was published in 2010 and a copy has been placed in the Library. The report includes an assessment of the economic, and environmental, impact of a reduction in the size of fires due to a wider use of automatic fire suppression systems in domestic properties.

Fires in dwellings by source of ignition, England, 2006-07 to 2010-11

	2006-07	2007-08	2008-09	2009-10	2010-11
Total	**44,422**	**41,397**	**38,523**	**37,481**	**36,625**
Deliberate	7,762	7,041	6,186	5,177	4,901
Accidental:					
Smokers' materials	2,378	2,311	2,108	2,129	2,263
Cigarette lighters	389	367	249	250	223
Matches	209	245	243	273	280
Space heating appliances	1,272	1,237	1,253	1,248	1,394
Cooking appliances	20,357	18,502	16,930	16,413	15,748
Central and water heating appliances	824	858	814	420	409
Blowlamps, welding and cutting equipment	402	404	250	177	169
Electrical distribution	2,533	2,368	2,717	3,405	3,468
Other electrical appliances	4,605	4,536	4,462	4,230	4,097
Candles	1,230	1,124	1,096	977	908
Other	1,755	1,674	1,575	1,964	1,902
Unspecified	708	729	639	818	863

Source: DCLG Fire Statistics

Fire Safety (01.12.11)

Asked by Lord Harrison: To ask Her Majesty's Government what assessment they have made of the likely impact on fire risk of an ageing population.[HL13647]

To ask Her Majesty's Government what assessment they have made of the possible impact on fire risk of an increase in vulnerable adults with (1) mental health, and (2) physical, disabilities living independently in domestic settings. [HL13648]

The Parliamentary Under-Secretary of State, Department for Communities and Local Government (Baroness Hanham): None. But my department is currently considering a number of research proposals.

Housing: Fire Safety (29.11.11)

Asked by Lord Harrison: To ask Her Majesty's Government, further to the Written Answer by Baroness Hanham on 16 November (WA 157), other than promoting the importance of a working smoke alarm, what action they are taking to improve fire safety in (1) privately owned housing, and (2) social housing.[HL13646]

The Parliamentary Under-Secretary of State, Department for Communities and Local Government (Baroness Hanham): I refer the noble Lord to the reply I gave to Lord Kennedy of Southwark on 16 December (WA 157).

Working smoke alarm ownership remains at the heart of our efforts to reduce accidental fire deaths and injuries in the home. During 2011-12, we will continue to promote the key message to householders of having a working smoke alarm in their home, through the Fire Kills campaign.

Furthermore, the UK Government welcome the referencing of the new safety standard for cigarettes which was published in the Official Journal of the European Union on 17 November 2011. Based on DCLG research, we calculate that the impact of cigarettes that comply with this standard (in England) will save between 25-64 lives per year.

High Rise Flats: Fire Extinguishers (30.11.11)

Meg Munn: To ask the Secretary of State for Communities and Local Government what assessment he has made of the cost effectiveness of retrofitting high rise tower blocks with automatic fire suppression systems; and if he will make a statement. [83524]

Andrew Stunell: We have not made a formal assessment. However, it is the Chief Fire and Rescue Adviser's view that it would not be economically viable or practical to fit sprinklers to all existing high-rise residential buildings.

It is a matter for individual housing owners and landlords to decide if automatic fire suppression is required as part of their fire safety strategy, based on their fire risk assessment.

Housing: Fire Extinguishers (29.11.11)

Meg Munn: To ask the Secretary of State for Communities and Local Government what information his Department holds on the use of automatic fire suppression systems in residential properties in other countries. [83525]

Andrew Stunell: The information requested is not held centrally. My officials do, as far as possible keep abreast of relevant international developments and ensure that any research or analysis uses all available data.

The cost benefit analysis that formed part of 2005 study into the effectiveness of residential sprinklers relied extensively on US data where UK data was not available. More recently, the 2010 "Cost Benefit Analysis of Options to Reduce the Risk of Fire and Rescue in Areas of New Build Homes" took account of US and New Zealand data as part of the research literature review. The 2010 report is available on the DCLG website at: *http://bit.ly/146uwac*

Housing: Fire Extinguishers (20.12.11)

Peter Aldous: To ask the Secretary of State for Communities and Local Government pursuant to the answer of 5 December 2011, Official Report, column 143W, on housing: fire extinguishers (1) which US data was relied on extensively in the final regulatory impact assessment published on 13 December 2006; [87118] (2) with reference to the Building Research Establishment Report 204505: Effectiveness of sprinkles in residential premises - an evaluation of concealed and recessed pattern sprinkler products, which data from other countries was viewed as not directly applicable or appropriate for the UK situation. [87119]

Andrew Stunell: The details of the analysis carried out by the Building Research Establishment are set out fully in their reports. These are, as set out in my previous answers, readily available on the internet. The benefits associated with the installation of sprinklers were calculated by estimating of the number of deaths and injuries that might be avoided and of the associated reduction in property loss.

Statistics from the United States were used to derive the estimated reduction in property loss. While the literature review included data from the United States of America, New Zealand and Canada, the researchers decided that they could not be used to robustly derive the estimated reductions in death and injury. Instead, a correlation between fire size and casualties was used.

Housing: Fire Extinguishers (05.12.11)

Peter Aldous: To ask the Secretary of State for Communities and Local Government what assessment was made in developing the Building Regulations 2000 of the merits of requiring installation of automatic fire suppression systems in new residential premises with respect to (a) comparative evidence from other countries, (b) the effect on the environment of a reduction in the size of fires, (c) the effect on the economy of a reduction in the size of fires, (d) the effect on firefighter safety and (e) the risk of fire for an ageing population. [84552]

Robert Neill: The last review of the fire safety aspects of the Building Regulations was completed in 2006. The Final Regulatory Impact Assessment was published on 13 December 2006. This sets out the details of the assessments made at that time and refers to the cost benefit analysis that formed part of a 2005 study into the effectiveness of residential sprinklers. This study relied extensively on US data where UK data was not available. The Impact Assessment and the 2005 report can be found on the Department website at: *http://bit.ly/140b2rd* and *http://bit.ly/176Vwx1*

Appendix B – 21 things you didn't know about sprinklers

1. Reliability

Sprinkler systems have been proven in use for well over 100 years, during which time they have a 99% success rate worldwide. Systems over 100 years old are still in full working condition today.

2. Popularity

More than 70 million sprinklers are fitted world-wide every year

3. Unnecessary Deaths

Thousands of people are killed every year in unsprinklered buildings world wide

4. Provide Time for Evacuation

Sprinklers are approved for life safety purposes. (They 'buy time' for evacuation and property protection)

5. Life Safety Record

In the UK, there has never been a fire death in a fully sprinklered building. US Government employees on business only stay in sprinklered hotels because the government will not otherwise pay their expenses.

6. Sprinklers Save Money

Losses from fires in buildings protected by sprinklers are estimated to be only one tenth of those in unprotected buildings.

7. Operational Facts

It is untrue that all sprinklers operate when fire breaks out. In 60% of cases, fires are controlled by the spray from 4 sprinklers or less.

8. Limited Water Damage

Reports of water damage caused by sprinklers are often exaggerated. Firemen often use 15 times more water from hoses to do the same job as a sprinkler.

9. Proven Reliability

Sprinklers are very stable and do not operate spuriously. Worldwide records show that only 1 in 16 million sprinklers installed per year will result in failure. Every single sprinkler head is independently tested before leaving the manufacturing plant.

10. Environmentally Friendly

Sprinklers help to protect the environment by controlling fire in its early stages, preventing airborne pollution and Fire Water Run Off - a poisonous cocktail of water and chemicals which can wash into our water sources through the ground, rivers and main drains, when the fire fighters launch a large scale water attack.

11. Conserve Water Sources

Sprinklers save water. Statistics show that widespread use of sprinklers could save up to 96% of the 5.6 billion litres of water used annually in the UK to fight large fires.

12. The Threat of Petroleum and Chemical Fires Reduced

Sprinklers can now be foam enhanced to control flammable liquid, chemical and petroleum fires which are difficult to control because they float on water.

13. Cost Effective to Install

The cost of installing a sprinkler system is roughly equivalent to carpeting the same building.

14. Insurance Discounts

Insurance companies sometimes offer discounts of up to 70% for buildings that are protected by Sprinklers.

15. Construction Trade Offs

Sprinklers can save on building costs because, under the Building Regulations, larger compartments (rooms) may be constructed. Reduced boundary and extended travel distances to exits are also allowed.

16. Legal Protection

Sprinklers can provide legal protection because a company can be held responsible for the consequences of a fire if adequate precautions have not been taken.

17. Protecting Investments

Sprinklers can help protect businesses by protecting investments, market positions and exports, reducing insurance costs.

18. Easy to Install

Sprinkler systems can be easily fitted to existing buildings.

19. Heritage Protection

Sprinkler systems are ideal for protecting irreplaceable heritage properties.

20. Fully Endorsed by Fire and Rescue Services and Others

The use of sprinklers is strongly supported by fire and rescue services, insurance companies, architects, building control officers and other specialists.

21. Domestic Applications

Special domestic sprinklers can now be installed to protect domestic houses and buildings of multiple occupancy.

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